

MARKED-UP VERSION OF THE AMENDMENTS

Claims 22-23 have been canceled.

Claims 7, 14, 28, 32-33, 37 and 45 have been amended as follows:

7. (Twice Amended) A process for the catalytic conversion of at least one reactant in a thermal chemical reaction, excluding deep oxidation, comprising:
passing at least one reactant into at least one reaction chamber;
said reaction chamber comprising a porous catalyst that catalyzes the reaction of said at least one reactant;
transferring heat to or from said at least one reaction chamber from or into at least one heat exchanger; and
obtaining at least one product from said reaction chamber;
wherein said porous catalyst comprises a metal support; and
wherein a contact time of the reactant is less than about 0.3 seconds, and the step of transferring heat, at steady state, transfers at least about 0.6 W/cc of total reactor volume, thereby suppressing slow reactions and the formation of at least one undesirable chemical reaction product.

14. (Amended) The process of claim 1 A process for the catalytic conversion of at least one reactant in a thermal chemical reaction, excluding deep oxidation, comprising:

passing at least one reactant into at least one reaction chamber;
said reaction chamber comprising a catalyst that catalyzes the reaction of said at least one reactant;
transferring heat to or from said at least one reaction chamber into at least one heat exchanger; and
obtaining at least one product from said reaction chamber;
wherein said step of transferring heat, at steady state, transfers at least 0.6 W/cc of total reactor volume, where total reactor volume is defined as the sum of the volume of the reaction chamber(s) and heat exchanger chamber(s) including the volume of chamber walls;
wherein a contact time of the reactant with the catalyst is less than about 0.3 seconds;
wherein a pressure drop through the reaction chamber is less than about 15 psig;
and
wherein the catalyst comprises an interfacial layer on a porous support.

28. (Amended) The process of claim 6 A process for the catalytic conversion of at least one reactant in a thermal chemical reaction, excluding deep oxidation, comprising:
passing at least one reactant into at least one reaction chamber;
said reaction chamber comprising a catalyst that catalyzes the reaction of said at least one reactant;

transferring heat to or from said at least one reaction chamber from or into said at least one heat exchanger; and

obtaining at least one product from said reaction chamber;

wherein said step of transferring heat, at steady state, transfers at least 0.6

W of heat per cc of total reactor volume, such that, at steady state, the catalyst is maintained within a temperature range that reduces the formation of at least one undesirable chemical reaction product; and

wherein the catalyst comprises an interfacial layer on a porous support, and a thermal coefficient of expansion of the porous support is different from a thermal coefficient of the interfacial layer.

32. (Amended) The process of claim 6 A process for the catalytic conversion of at least one reactant in a thermal chemical reaction, excluding deep oxidation, comprising:

passing at least one reactant into at least one reaction chamber;

said reaction chamber comprising a catalyst that catalyzes the reaction of said at least one reactant;

transferring heat to or from said at least one reaction chamber from or into said at least one heat exchanger; and

obtaining at least one product from said reaction chamber;

wherein said step of transferring heat, at steady rate, transfers between about 10 and about 100 W/cc of total reactor volume, such that, at steady state, the catalyst is maintained within a temperature range that reduces the formation of at least one undesirable chemical reaction product.

33. (Amended) The process of claim 7 A process for the catalytic conversion of at least one reactant in a thermal chemical reaction, excluding deep oxidation, comprising:

passing at least one reactant into at least one reaction chamber;

said reaction chamber comprising a porous catalyst that catalyzes the reaction of said at least one reactant;

transferring heat to or from said at least one reaction chamber from or into at least one heat exchanger; and

obtaining at least one product from said reaction chamber;

wherein said porous catalyst comprises a metal support;

wherein a contact time of the reactant is less than about 0.3 seconds, thereby suppressing slow reactions and the formation of at least one undesirable chemical reaction product; and

wherein the catalyst comprises an interfacial layer on a porous support, and a thermal coefficient of expansion of the porous support is different from a thermal coefficient of the interfacial layer.

45. (Amended) The process of claim 11, wherein the A method for suppressing formation of at least one undesirable chemical reaction product in a thermal chemical reaction, comprising:

passing at least one reactant into at least one reaction chamber;
said reaction chamber comprising a porous catalyst that catalyzes the
reaction of said at least one reactant;
transferring heat to or from said at least one
reaction chamber from or into at least one heat exchanger;
obtaining at least one product from said reaction chamber; and
maintaining a contact time of the reactant at less than 0.01 seconds, thereby
suppressing slow reactions and reducing the formation of at least one undesirable
chemical reaction products;
wherein the catalyst comprises an interfacial layer on a porous support, and
a thermal coefficient of expansion of the porous support is different from a thermal
coefficient of the interfacial layer;
wherein a catalyst material is deposited on the interfacial layer; and
wherein said porous catalyst comprises a metal support.

New claims 47-48 have been added.